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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/524,435

02/15/2005

Henri Cramail

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01/02/2008

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EXAMINER

CHOI, LING SIU

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

01/02/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

### Application No.

10/524,435

### Applicant(s)

CRAMAIL ET AL.

### Examiner

Ling-Siu Choi

### Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 02/15/2005.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. this Office Action is in response to the Preliminary amendment filed 08/07/2006.

Claims 1-13 are pending, wherein claims 1-5 are drawn to a process to prepare a silicon containing metal compound; claims 6-7 are drawn to a process to prepare a silicon containing metal compound; claim 8 is drawn to a polymerization catalyst system; claims 9-13 are drawn to a process to polymerize olefin monomers.

### *Claim Analysis*

2. Summary of Claim 1:

A process to prepare a silicon containing transition metal catalyst compound, comprising the steps of	
A	<b>non-hydrolytic</b> sol-gel condensation of a silane with an halogenated silane (or siloxane) and an alkoxysilane wherein the silane = $L_xSiQ_n$ L = a $\pi$ -bonded ligand, Q = an anionic ligand, $x + n = 4$ ,
B	optionally alkylation,
C	deprotonation, and
D	addition of a transition metal compound.

Summary of Claim 6:

A process to prepare a silicon containing transition metal catalyst compound, comprising the steps of	
A	<b>non-hydrolytic</b> sol-gel condensation of a silane with an halogenated silane (or siloxane) and an alkoxysilane wherein the silane = $L_xSiQ_n$ L = a $\pi$ -bonded ligand, Q = an anionic ligand, $x + n = 4$ ,
B	alkylation,
C	addition of a transition metal amine

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Santos et al. [ Polymer 42, 4517-4525(2001)] in view of Roggero et al. (EP 0 312 160).

Santos et al. disclose a process to prepare a catalyst, comprising the steps of  
(A) providing a xerogels ( $Ind_2SiO_2$ ) obtained by hydrolysis and condensation reactions

of  $\text{Si}(\text{OEt})_4$  (TEOS) and  $(\text{EtO})_2\text{Si Ind}_2$ ; (B) reacting the resulting xerogel with TEA (triethylaluminum – **alkylation agent**) and then with the hexane solution of n-BuLi (**deprotonation agent**), followed by reacting with  $\text{ZrCl}_4 \cdot 2\text{THF}$ ; and (C) optionally contacting with the toluene solution of MAO to form the catalyst (sections 2.2 and 2.3). Santos et al. further disclose that the catalyst is used to polymerize ethylene (section 2.4).

The difference between the present claims and the disclosure of Santos et al. is the requirement of the xerogel obtained by the non-hydrolytic condensation process.

Hayes et al. disclose that “.....synthesised some alkyl- and aryl-modified silicates (and linear polyorganosiloxanes) by reacting various combinations of dimethyldichlorosilane, methylphenyldichlorosilane, phenyltri- chlorosilane, phenyltriethoxysilane and phenylethyldiethoxysilane in the presence of iron(m) chloride or aluminium(m) chloride catalyst.....” (page 1811). Hay et al. further disclose that the advantages associated with the non-aqueous process includes (1) the potential to avoid the use of solvents, with their various drawbacks and (2) reduction or elimination of residual silanol groups in the product resulting from the different mechanistic course of the reaction compared with the hydrolytic sol-gel route (page 1811, col. 1). In light of such benefits, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use xerogel obtained by the non-hydrolytic sol-gel process in the disclosure of Santos et al. and thereby obtain the present invention.

5. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Santos et al. [Applied catalysis A: General 220, 287-302(220)] in view of Roggero et al. (EP 0 312 160).

Santos et al. disclose a process to prepare a catalyst, comprising the steps of (A) obtaining a indenyl-silica xerogel by cohydrolyzing  $\text{Ind}_2\text{Si}(\text{OEt})_2$  and TEOS(1:3 ratio); (B) contacting the resulting xerogel with n-BuLi solution; and then (C) adding  $\text{ZrCl}_4 \cdot 2\text{THF}$  to form a catalyst (sections 2.3 and 2.4). Santos et al. further disclose that a combination of the catalyst and MAO (or TMA) is used for ethylene polymerization (section 2.5).

The difference between the present claims and the disclosure of Santos et al. is the requirement of the xerogel obtained by the non-hydrolytic condensation process.

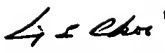
Hayes et al. disclose that “.....synthesised some alkyl- and aryl-modified silicates (and linear polyorganosiloxanes) by reacting various combinations of dimethyldichlorosilane, methylphenyldichlorosilane, phenyltri- chlorosilane, phenyltriethoxysilane and phenylethyldiethoxysilane in the presence of iron(m) chloride or aluminium(m) chloride catalyst.....” (page 1811). Hay et al. further disclose that the advantages associated with the non-aqueous process includes (1) the potential to avoid the use of solvents, with their various drawbacks and (2) reduction or elimination of residual silanol groups in the product resulting from the different mechanistic course of the reaction compared with the hydrolytic sol-gel route (page 1811, col. 1). In light of such benefits, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to use xerogel obtained by the non-hydrolytic sol-gel process in the disclosure of Santos et al. and thereby obtain the present invention.

***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on 571-272-1114.

  
LING-SUI CHOI  
PRIMARY EXAMINER

December 20, 2007